

Application No.: 09/889,269

Attorney Docket No.: FUK-84

Reply for Office Action Dated: February 9, 2004

REMARKS

Claims 1 and 2 are pending in the application. Claims 3 and 4 have been previously cancelled.

Claim 1 stands rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,656,099 to Ohmi.

Applicant respectfully submits that Claim 1 is patentable over Ohmi because this reference neither teaches nor suggests a passivation film for a metallic material that employs an oxidized chromium coat on the metallic material, as set forth in Claim 1. As discussed further, the chromium oxide passivation layer of Ohmi does not incorporate any such chromium coat, i.e., a coating of chromium that is oxidized to produce the chromium oxide passivation film, as in the invention.

Referring to Ohmi, the disclosed oxide passivation film does not contain a chromium coat. According to Ohmi, the chromium available for oxidation to produce the chromium oxide layer at the surface of the base metal (stainless steel) is provided not as a chromium coat, but as bulk dispersed chromium atoms that diffuse to the surface of a heterogeneous alloyed mixture of various substances, including chromium and other metals. As so diffused, these chromium atoms do not constitute a chromium coat. In particular, chromium is provided not as a coat, but as one constituent material dispersed in bulk throughout the base structure (steel). For example, the base material used by Ohmi includes stainless steel (iron) comprising, for example, an admixture of carbon, silicon, manganese, phosphorus, sulfur, nickel, chromium, molybdenum, and aluminum. (See Col. 3, lines 4-10). Accordingly, relative to the steel structure, there is no

Application No.: 09/889,269

Attorney Docket No.: FUK-84

Reply for Office Action Dated: February 9, 2004

coating of chromium. Rather, the chromium that eventually becomes part of the passivation film is provided in bulk with the other constituents randomly dispersed throughout the steel body.

In order to direct the chromium to the surface of the steel, the steel in Ohmi is pretreated with an electrochemical buffering process that facilitates the formation of a so-called “Beilby layer” (workstrain layer) at the steel surface. (Col. 4, lines 13-27; Col. 5, lines 35-50). Due to this buffering process, the steel surface is made suitable to receiving chromium atoms that diffuse from interior bulk locations to the surface. However, Applicant does not consider such diffused chromium, even though present at the steel surface, to constitute a chromium coat. (The chromium oxide passivation film of Ohmi is then formed by subsequent oxidation of the as diffused chromium.)

By comparison, in the invention, the chromium medium that is oxidized is provided as a chromium coat disposed on the metallic material. (See Page 3, line 25; Page 4, lines 1-7; Page 6, lines 1-10; Page 8, lines 3-9; Page 10, lines 3-7; Abstract). One advantage realized by the use of such chromium coating of the invention - in structuring a passivation film - is that the integrity, purity, homogeneity, and geometry of the chromium structure is much more readily controlled since the chromium is integrated with the metallic material as a coating. By comparison, in Ohmi, several quality control factors and processing parameters have to be closely and precisely controlled and coordinated to ensure that the appropriate amount and concentration of chromium migrates to the steel surface from the bulk dispersion, while excluding other materials. For example, Ohmi requires controlling the steel crystal grain size, content of H₂O gas, and temperature. (Col. 4, line 47 to Col. 5, line 50).

Application No.: 09/889,269
Attorney Docket No.: FUK-84
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In sum, Ohmi provides no disclosure of a passivation film having an oxidized chromium coat on a metallic material, as set forth in Claim 1. In Ohmi, it is considered an essential and necessary teaching to form a surface work strain layer using electrochemical buffering of the steel surface, in order to produce the aforementioned “Beilby layer” or work strain layer to thereby accommodate diffusion of bulk dispersed chromium to the steel surface. (Col. 4, lines 6-8). The necessity of producing such surface work strain layer presupposes and requires a base structure that employs chromium not as a coat, but as a material constituent provided in bulk dispersion throughout the base structure (steel alloy). Accordingly, Ohmi also teaches away from any adaptation or modification that would employ chromium as a coating.

In view of the foregoing, Applicant believes that Claim 1 is patentable over Ohmi and respectfully requests that this rejection be withdrawn.

Claims 1 and 2 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 4,248,676 to Uchida et al. (hereinafter “Uchida”) in view of Ohmi.

Applicant believes that Claims 1 and 2 are patentably distinguishable over Uchida in view of Ohmi, for reasons similar to those set forth above in connection with the rejection of Claim 1 under 35 U.S.C. § 102(b).

Uchida discloses a structure (Fig. 1) having a chromate layer 3 overlying a strictly chromium layer 2 disposed on steel plate 1. Uchida contains no teaching or suggestion regarding oxidation of chromium layer 2 to provide chromium oxide, much less providing a structure having a passivation film with an oxidized chromium coat. Additionally, it is not seen how such oxidation would occur in Uchida to transform the chromium layer 2 into chromium oxide, considering the inaccessibility and unexposed location of chromium layer 2 owing to the

Application No.: 09/889,269

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necessary interposition of chromium layer 2 between chromate layer 3 and steel plate 1. (Col. 8, lines 59 *et seq.*; Fig. 1; Abstract). Rather, considered as a whole, the Uchida disclosure regards the intervening layer 2 as a homogeneous structure to be formed strictly from chromium (i.e., not processed further to form chromium oxide or other heterogeneous formation). Regardless, the Ohmi disclosure cannot be relied upon for any teaching directed to providing a structure having an oxidized chromium coat, since as stated above Ohmi does not teach chromium in the form of a coat, but necessarily as an alloyed constituent in bulk dispersion that atomically diffuses to the steel surface in response to a buffing pretreatment operation. Accordingly, it would not be obvious as the Examiner suggests to provide the chromium layer 2 of Uchida as a chromium oxide coat in view of Ohmi.

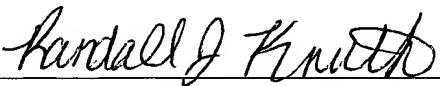
In view of the foregoing, Applicant believes that Claims 1 and 2 are patentable over Uchida in view of Ohmi and respectfully requests that this rejection be withdrawn.

Applicant believes that the application is now in condition for allowance and respectfully requests favorable action in accordance therewith.

Application No.: 09/889,269
Attorney Docket No.: FUK-84
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If the Examiner has any questions or comments that would advance prosecution of this case, the Examiner is invited to call the undersigned at 260/484-4526.

Respectfully Submitted,



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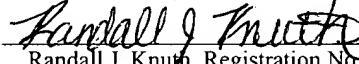
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Enclosures: Explanatory Cover Sheet - Page 1
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CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the U.S. Postal Service as first class mail in an envelope addressed to: Commissioner for Patents, PO Box 1450, Alexandria, VA 22313-1450, on: August 5, 2004.



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August 5, 2004

Date